**In your groups** *If you drop a hot potato into a cup of cold water, which way will energy be transfered by heating? Why?*

The Second Law of thermodynamics clarifies this rule, and extends it to cases where there might be other things going on, e.g. in the case of a refrigerator.

The second law involves the change in entropy, which I defined for you previously:

$$\Delta S = \int \frac{đQ_{\text{quasistatic}}}{T} \tag{1}$$

The Second Law of Thermodynamics simply states that for any possible process, the change in entropy of a system plus its surroundings is greater than or equal to zero.

$$\Delta S_{\text{system}} + \Delta S_{\text{surroundings}} \geq 0 \tag{2}$$

This law famously gives the "arrow of time," meaning that it is the physical law that tells us which things can happen "forwards" but not "backwards." One handy trick when considering any process is to ask yourself if the precise reverse could happen. If it couldn't, then you can safely conclude that the entropy of the system plus its surroundings must have increased.